

Third Street S.E. Bridge
Spanning Nimishillen Creek
Canton
Stark County
Ohio

HAER No. OH-23

HAER
OHIO,
76-CANT,
4-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
MID-ATLANTIC REGION NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR
PHILADELPHIA, PENNSYLVANIA 19106

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HISTORIC AMERICAN ENGINEERING RECORD

THIRD STREET S.E. BRIDGE

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I. Introduction

A. Location:

Spanning the East Branch of Nimishillen Creek at Third St., S.E. in the City of Canton, Stark County, Ohio. (See Figure I.)

Latitude: 40°-47'-37".
Longitude: 81°-21'-30".
UTM: 17.469780 14515700
Quad: Canton, East

B. Construction Dates:

Original Construction at Navarre Road, S.W. - 1883.
Moved and rebuilt at Third Street, S.E. - 1913.

C. Designer and Builder:

The Wrought Iron Bridge Company, Canton, Ohio.

D. Original and Present Owners:

Stark County Commissioners: 1883 - 1913.
City of Canton: 1913 - Present.

E. Present Use:

None. Closed to vehicular traffic, June 2, 1978.
Closed to pedestrian traffic, August 4, 1981.

F. Significance:

The Third Street S.E. Bridge is located in the hometown of the Wrought Iron Bridge Company and is typical of the many pin-connected through truss bridges they built in the period between 1880 and 1900. Their wrought iron Pratt-type truss bridges approached perfection, with respect to providing economical structures that were both lightweight and strong, consisting of simple members that were relatively easy to manufacture, transport and erect. David Hammond, founder of the Wrought Iron Bridge Company was a self-taught genius who conceived and put together a highly successful company that marketed, designed, fabricated and built notable bridges.

G. Project Information

Demolition of the Third Street S.E. Bridge is to be funded in part by the Federal Highway Administration. Under Section 106 of the Historic Preservation Act of 1966, mitigative documentation was undertaken in 1982 by the City of Canton Department of Planning and Zoning and the Department of Civil Engineering in consultation with Richland Engineering Limited.

II. History of the Bridge

A. The Original Crossing.

The Third Street Bridge was originally constructed on Navarre Road over the west branch of Nimishillen Creek in 1883./1/ The road served as an important commercial link between the City of Canton and the Ohio Canal, at the Village of Rochester in Bethlehem Township. The road also served as an important agricultural link to the farms located southwest of the City, in parts of Canton, Perry and Bethlehem Townships. During the latter part of the 19th Century, Canton had become an important industrial center, with much of the work involved in the manufacture of farm machinery./2/ The City also served as a marketplace for the sale of agricultural products for local consumption and as a rail center for the shipment of agricultural products to other population centers. Farmers in the area travelled to Canton to purchase supplies and equipment and to process their grains at the grist mill, located adjacent to the bridge site. (See Figure 2.)

B. Bridge Building in Stark County.

In the early days of the territory that was to become the State of Ohio, travel on the major roads was impeded by gorges and waterways that could not be bypassed. The shallow waterways were forded and the deeper waterways were rafted or served by toll ferries. During periods of high water and the breakup and movement of river ice, travelers were forced to wait until the waters receded and the crossings became passable. As the territory developed, enterprising individuals erected toll bridges to span the heretofore impassable gorges and waterways. The first toll bridges consisted of timber plank decks, carried by timber beams that were supported by timber bents and abutments. The toll cost covered profit, the initial cost of construction, and the cost of maintaining the crossing.

The first bridge in Stark County was a toll bridge, built for William Henry and Alexander Skinner by Thomas A. Drayton in 1815. The bridge was 600 feet long with three covered timber-truss spans. The bridge rested on stone masonry piers and abutments, and carried the Pittsburgh to Ft. Wayne Road over the Tuscarawas River, in Perry Township (presently Lincoln Way in the City of Massillon)./3/ The first iron bridge reported to be erected in Stark County was a rather crude deck truss span of 28 feet. The bridge was built by C.M. Russell & Co., in 1859./4/

The early bridge builders were mainly carpenters and stone masons, whose experience was gained in the "trial and failure" school. In 1817, a bridge was built over the Tuscarawas River in Bethlehem Township, and was swept away by ice and high water the following winter. The township trustees awarded a contract to rebuild the bridge to Jonathan Neely and Paul Beard, who tried but failed to complete the project. In the call for new proposals, the trustees stipulated that, "none but good workmen need apply, for we are tired of pretended workmen." The bridge was finally completed in 1822./5/

David Hammond, founder of the Wrought Iron Bridge Company of Canton, Ohio, was born on a farm in Plain Township in 1830. When he was 18, he moved to Canton where and began his apprenticeship with the prominent carpenter, William P. Prince. By 1860, David Hammond had established his own building construction company and along with other work constructed several timber bridges. Not satisfied with the limitations of timber members and their connections in bridge construction, he developed the combination bridge, which substituted certain iron members in the structure to eliminate recurring problems and weak details. In this endeavor he worked with Washington Reeves, a local metal worker, and John Laird, owner of the local foundry. They also determined it was possible to design and manufacture all-iron bridges. In 1862, David Hammond obtained a contract to construct an iron bridge over the middle branch of Nimishillen Creek in Canton, for \$1,200. The bridge was to have a span of 60 feet and carry a 12-foot roadway. The bridge was erected and proved to be satisfactory in all respects./6/

The partnership of Hammond and Reeves was formed in 1864, to engage in bridge building and general contracting. They erected a small fabricating plant in the vicinity of the Fort Wayne Railroad (Conrail) near the Union Mill Dam (west branch of Nimishillen Creek) and proceeded to obtain contracts for repair projects and to construct small bridges. It appears that Reeves was satisfied and interested in seeking only small projects whereas Hammond was more interested in growth and in seeking larger projects. As a result, David Hammond formed the Wrought Iron Bridge Company in 1865, and for the next four years both companies continued to operate out of the small fabricating plant./7/ In time, the workload of the growing Wrought Iron Bridge Company began to dominate the dual operation and strain the limited capacity of the plant. In 1870, the partnership of Hammond and Reeves was terminated and Washington Reeves returned to the metalworking trade.

In 1871, the Wrought Iron Bridge Company was incorporated with \$100,000 capital and an ambitious program for growth. A new fabricating facility was erected at East Ninth and Saxton Streets, (Fourth Street S.E. and Savannah Avenue), opposite the passenger station of the Fort Wayne Railroad. Skilled workers and graduate engineers were hired and branch offices established to support a wide-spread sales effort. The results were amazing and the newly incorporated company immediately took its place among the leading bridge builders in the country. The sales grew from 100 bridges in 1871 to 490 in 1880. By 1880 the company had erected 3,300 spans with bridges located in 25 states and Canada. During this period, David Hammond served as president./8/ In 1881, he was removed as president and for the next nine years served as sales agent and in other capacities. In 1890, David Hammond resigned from the Wrought Iron Bridge Company and withdrew his stock./9/

In 1891, his son Vinton and son-in-law, John Reed, convinced David Hammond that he was too young to retire and together they organized the Canton Bridge Company. The company was incorporated with \$150,000 capital and erected a fabricating facility at Belden and Wheeler (Tenth Street N.E.) Streets in Canton. David Hammond was elected president in 1893 and served in that capacity until 1897, when he voluntarily stepped down to the vice-presidency, where he served until his death in 1905. The Canton Bridge Company was as much of a success as the Wrought Iron Bridge Company. Established in a similar manner, the Canton Bridge Company also took its place among the leading bridge builders in the country. By 1902, they had built more than 6,000 bridges./10/

C. Original Construction at Navarre Road /11/

The Third Street S.E. Bridge was designed, fabricated and erected in 1883. The engineering principles developed by the Wrought Iron Bridge Company are sound even today. Considering that the work was performed almost 100 years ago, in the relative infancy of structural analysis, one must be impressed by the soundness and maturity exhibited by their designers. The design criteria developed by the company took into account the live loads that the structure would reasonably be expected to carry over its life, the effects of fatigue on the truss members and the need to consider buckling in members subjected to compressive stresses./12/ Their engineers chose to carry the roadway structure over the crossing on a pin-connected Pratt-type wrought iron through truss structure, supported by stone masonry abutments.

An examination of the members and their connections revealed the inventiveness and ingenuity of their detailers, in simplifying structural details, specifying readily available shapes and using relatively light members to achieve a strong but easily fabricated and erected structure. The 100-year life of subject structure attests to the high quality of workmanship involved in its construction.

The bridge carried the 20-foot wide roadway and two five-foot side-walks of Navarre Road over the west branch./13/ The through truss structure spanned 98.67 feet between abutments, located on each side of the creek. The roadway deck support structure consisted of 11 lines of 4 x 12 inch timber stringers running longitudinally along the length of the bridge, spaced at 24-inch centers. Each stringer line consisted of 8 simple spans of 12.33 feet, for an overall length of 98.67 feet. At the ends of the bridge, the stringers rested on the masonry abutments. Between abutments, the ends of the stringers were supported by 28-inch wrought iron built-up floorbeams. The 7 floorbeams were placed transversely to the roadway on 12.33 feet centers, spaced across the bridge. The roadway deck consisted of three-inch timber planks, 8 to 12 inches wide and laid transversely over the 11 lines of timber stringers. The 4 x 6 inch timber curbs were located along the edges of

the roadway deck. Each sidewalk deck support structure consisted of three lines of 3 x 8 inch timber stringers running longitudinally along the length of the bridge in a manner similar to the roadway stringers. The sidewalk decks consisted of two-inch timber planks, 6 to 8 inches wide and laid transversely over the three lines of timber stringers. Ornamental iron railings protected the outsides of the walks and were framed into the outside stringers. Steel outriggers at each of the floorbeams provided lateral stability to the railings.

Two parallel wrought iron through trusses, running longitudinally between the abutments and set 23 feet apart, supported the wrought iron floorbeams. The 35-foot long riveted, built-up floorbeams were suspended from the lower chord truss pins and cantilevered six feet beyond each of the trusses to furnish support for the sidewalks and railings. The floorbeams were 28 inch built-up I-beams consisting of one web plate and two top and two bottom flange angles and were supported from the lower chord pins with U-bolt and plate connections.

The through trusses were stabilized by portals, horizontal struts and lateral bracing, placed between the top chords and by the floorbeams, roadway deck and lateral bracing, placed between the bottom chords. The wrought iron members consisted of riveted built-up shapes for the end posts, top chords and verticals. The end post and top chord sections consisted of one top plate, two side channels and bottom lacing. The vertical sections consisted of two side channels with two sides of lacing. The lower chords, diagonals, hip verticals and counters consisted of pairs of forged eye bars. The panel point pins were forged, machined and threaded for keeper nuts. The eight truss panels were each 12.33 feet long and 22.13 feet high.

There were probably no major difficulties encountered by the Wrought Iron Bridge Company in building the structure. The stonework was ordered and obtained from a local quarry and the steelwork was fabricated and shop painted in the plant at Ninth and Saxton Streets. The quantities of materials used in building the bridge included approximately 750 tons of stone masonry, 75,000 pounds of wrought iron and 75,000 board-feet of lumber. The maximum weight of any bridge component was 2,000 pounds in the stonework, 1,500 pounds in the floorbeam members and 1,000 pounds in the truss members, weights that were easily handled by the wagons, skids and gin poles then in common use.

After placing the cut stone masonry on the prepared foundations, the contractor placed timber bents and falsework between the abutments to support the metal floorbeams and truss members during erection. After the trusses were complete, the floorbeam connections made and the struts, bracing and railing added, the falsework was removed and the metalwork was given the finish coats of paint. The timber stringers and decking were then installed and the bridge approaches finished. The structure was then ready to open for traffic.

D. Changes to Accommodate Streetcars/14/

In 1900, the Northern Ohio Traction and Light Company extended streetcar service west on Navarre Road. The single track line was carried over the bridge and was located on the south side of the roadway deck. The plank deck was modified to accommodate the two rails and two new double-channel steel stringers were added to carry the track.

In 1909, the traction company added a second streetcar line over the bridge, located on the north side of the roadway deck. The plank deck was modified and two new double-channel steel stringers were added.

E. Move to Third Street S.E./15/

In December 1911, the City of Canton notified the Stark County Commissioners of the dangerous condition of the Navarre Street Bridge. The roadway deck was in bad condition, the 20-foot wide bridge roadway was too narrow for the two streetcar tracks and the 36-foot wide street sections leading to each end of the bridge. The commissioners instructed the County Engineer to prepare plans for a new bridge on Navarre Street and plans to move the existing structure to provide a new crossing at East Eighth street (Third Street S.E.) over the east branch of Nimishillen Creek. The plans called for a new two-span stone-arch bridge carrying Navarre Street on a 40-foot wide roadway over the west branch, for building new abutments on East Eighth Street (Third Street S.E.) at the east branch, and for moving the existing bridge from Navarre Street to the East Eighth Street crossing. The plans were presented and approved by the County Commissioners on September 16, 1912 and the County Auditor was instructed to advertise the three projects for bids. Bids were received on October 16, 1912 and the following awards were made:

1. Construction of the new bridge on Navarre Street.
Contract to Peter Schisler for \$13,279 (December 30).
2. Construction of new abutments at East Eighth Street.
Contract to E. D. Unkefer for \$2,376 (November 18).
Work to be completed by April 12, 1913.
3. Moving and resetting existing superstructure at East Eighth St.
Contract to E. J. Landor/16/ for \$900 (January 20, 1913). Work to be completed within 60 days after the temporary runaround was opened at Navarre Street.

The new stone masonry abutments were constructed in the Spring of 1913 and the existing superstructure was moved and reset on the new abutments. Extra work contracts were issued to cover replacing the stringers with nine lines of new 7-inch steel I-beam stringers and a new 4-inch timber strip roadway deck. Other extra-work contracts covered additional stone and concrete at the abutments and additional fill on the approaches to the bridge.

The change in the nature of the traffic on the relocated bridge was substantial. In 1913, Navarre Street was a major traffic artery carrying two streetcar tracks, a heavy volume of highway traffic and a high percentage of trucks. East Eighth Street, on the other hand was a new extension of a secondary street, expected to carry a moderate volume of traffic, primarily passenger vehicles and pedestrians. At that time, the bridge was already 30 years old. It continued to serve traffic well for another 65 years.

III. Decline and Recent History

A. Alterations and Repairs to the Bridge.

Over the years, no changes from the original construction were made to the floorbeams or truss members. Changes were made to the original timber plank decks and timber stringers.

In 1900 and 1909, street railway lines were installed on the bridge roadway deck. A steel double-channel stringer line was added under each of the rails to support the heavy streetcars. The rails and four new lines of steel stringers were so positioned that they did not interfere with the 11 lines of timber stringers.

In 1913, the bridge was moved to Third Street where there were no street railway lines. The 3-inch timber plank roadway deck was replaced by a new 4-inch timber strip deck and the timber stringers and steel stringers supporting the steel streetcar rails were replaced by nine new lines of 7-inch steel I-beam stringers.

In 1944, the City performed a repair project which included replacing the six lines of timber sidewalk stringers, repairing damaged sections of the timber plank sidewalk deck and timber strip roadway deck, replacing the steel guardrail, tightening loose tension rods in the sway bracing and truss members and painting the metalwork. The estimated cost was \$2,700. In addition, new concrete sidewalks were installed on the bridge approaches. The estimated cost was \$130./17/

In 1952, the City contracted for a major rehabilitation project which included replacing the timber sidewalk stringers with six new lines of 6-inch steel I-beam stringers, replacing the timber plank sidewalks with new 3/4-inch steel open grid decking, adding eight new lines of 7-inch steel I-beam roadway stringers to the existing nine lines, replacing the timber strip roadway deck with a new asphalt-filled corrugated steel plate deck, replacing the steel guardrail, painting the metalwork and rebuilding the tops of the masonry abutment backwalls with concrete./18/

Plans for a major rehabilitation project were developed by the City in 1977. The project would have provided new steel tube roadway stringers and wheelguards, a new 5-inch steel open grid roadway deck, new steel cross-bridging between floorbeams, new steel end-dams, new lower chord truss pins, new reinforced concrete approach slabs, etc. The estimated cost was \$150,000./19/ The project was dropped because of the limited benefits to be derived and the high cost to the City. (\$6,000 of OHPO - Historic Preservation funds and \$144,000 of City funds.)/20/

Plans for a replacement project are currently being processed by ODOT-FHWA for construction in 1982-83. The new structure will be a two-span prestressed concrete box beam bridge. The estimated cost is \$130,000. (FHWA Bridge Replacement funds, 75% of the Construction Cost plus City funds.) The City of Canton conducted an exhaustive search to relocate the existing Pratt-type structure at some other location but to no avail. The bridge will be removed to make way for the replacement bridge. /21/

B. Recent Inspections

The City Engineer conducted inspections of the bridge in 1970, 1972 and 1976./22/ The roadway deck was found to be in critical condition, the sidewalk railing, roadway expansion joints, stringers, lateral bracing and paint in poor condition and the sidewalks, floorbeams and truss members in fair condition. In the Spring of 1978, the City Engineer inspected the bridge and declared it to be unsafe for vehicular traffic. The bridge was closed and barricades erected at each end of the roadway deck. In the Spring of 1981, the City Engineer inspected the bridge and declared it to be unsafe for pedestrian traffic. The sidewalks were closed and the ends barricaded./23/

C. Loading Carrying Capacity of the Bridge

If the bridge engineer could have his way, the structures he designs would stand forever, continue to function as intended and serve the users faithfully, without interruption.

If the engineers of the Wrought Iron Bridge Company could have had their way, the bridge erected at Navarre Road in 1883, "would have a life of over 328 years of constant usage and still be in good condition for future use."/24/ The failure of the bridge to live up to the expectations of its builder was not due to poor design, shoddy workmanship or flawed material. It happened because the bridge was subjected to overloaded vehicles, poor maintenance and the more recent use of corrosive de-icing agents.

At the time the bridge was built, maximum live loads consisted of the weight of crowds of people, herds of cattle and trains of loaded horse-drawn wagons. The average weight obtained from experiments was 90-pounds per square foot, and from the observation of bridges on well

travelled roads, 41 pounds./25/ The street railway cars added to the bridge roadway in 1900, had maximum weights of 20 tons or more and in trains developed live loads of 144 pounds per square foot./26/ The axle load of the current HS-20 truck loading used to design bridges is 32 tons which would produce an equivalent live and impact load of 337 p.s.f. on the hip vertical (member U₁L₁)./27/

The heavy use of de-icing agents in winter months combined with poor maintenance, subjects lower chord members, stringers and floorbeams to year around exposure from the corrosive dirt and debris that pockets and lies against these members. Wrought iron exposed to a salt water environment corrodes six times faster than in a fresh water environment./28/

The following tables show the load carrying capacity of the Third Street truss bridge, as it was with the design loads of 1880 and as it is with the current HS-20 (1944) design truck loading./29/ The bridge had sufficient width and strength to safely carry the design loads of the 1880's. It was not wide enough or strong enough to safely accommodate the larger vehicles, heavier loads and higher speeds of current traffic. In good condition the bridge could only have supported an HS-6 truck (6-Ton Posting). If the bridge had been rehabilitated, including a new deck and stringers, it would still have been restricted to the HS-5 truck (5-Ton Posting). At the time the bridge was closed in 1978, the capacity based on the deteriorated floor system was HS-2 (4000-pound Posting).

Current Load Carrying Capacity

<u>Structural Component</u>		<u>Original Condition</u>	<u>Deteriorated 1976</u>
1.	Floor System (1952) Asph. & Corr. Pl., 16" spans	HS-20.0	HS-2.0
2.	Stringers (1913) 7" I-beam, 12.33' span	HS-11.6	HS-3.9
3.	Floorbeams (1883) 28" Built-up beams	HS-11.1	HS-8.3
4.	Truss Members (1883)		
	L ₀ U ₁ U.C.	HS-26.8	HS-20.1
	U ₃ U ₄ U.C.	HS-26.5	HS-19.9
	L ₀ L ₁ L.C.	HS-7.1	HS-5.3
	U ₁ L ₁ Vertical	HS-13.1	HS-9.8
	U ₂ L ₃ Diag.	HS-6.2	HS-4.7

Original Design Capacity - Navarre Road Bridge - 1883

	<u>Original Material Structural Component</u>	<u>Allowable Stresses</u>	<u>DL & Max. LL Actual Stresses</u>
1.	Floor System 3" timber plank, 24" spans	1,200 psi	38 psi
2.	Stringers 4"x12" timber beam, 12.33' Span	1,200 psi	560 psi
3.	Floorbeams 28" Built-up beams	11,500 psi	7,530 psi
4.	Truss Members		
	L ₀ U ₁ U.C.	10,200 psi	5,350 psi
	U ₃ U ₄ U.C.	10,800 psi	5,960 psi
	L ₀ L ₁ L.C.	14,000 psi	13,730 psi
	U ₁ L ₁ Vert.	14,000 psi	6,980 psi
	U ₂ L ₃ Diag.	14,000 psi	13,570 psi

FOOTNOTES

/1/ Navarre Street S.E. was called the "Rochester-Bethlehem and Canton Road," in the 1850's. At that time the settlement of Rochester was located on the east bank of the Tuscarawas River, in the northwest corner of Bethlehem Township, and the Ohio Canal passed through the town. The Settlement of Bethlehem was located within one mile, to the east. In 1860, the portion of the road within the City of Canton, running between the west branch of Nimishillen Creek and Market Street, was named "Mill Street." In 1870, the settlements of Rochester and Bethlehem had been combined to form the Village of Navarre and the road was renamed Navarre Road.

/2/ Perrin, W. H. History of Stark County, 1881. Page 344, lists the Industrial Enterprise of the City of Canton, as reported in 1879.

<u>Company</u>	<u>Employees</u>	<u>Annual Product</u>
C. Aultman	550	\$2,000,000 farm machinery
Diebold Safe & Lock	250	1,000,000 large safes
Wrought Iron Bridge Company	150	500,000 bridges
Canton Steel Works	140	400,000 steel works
C. Russel & Co.	70	275,000 farm machinery
J. Biechele	26	180,000 soap works
Canton Spring Works	80	135,000 wagon springs
Bucher, Gibbs & Co.	75	125,000 plow shop
Whitman & Barnes Mfg.	40	70,000 farm machinery
Novelty Iron Works	35	50,000 iron products
A. Ball & Co.	30	50,000 plow works
E. E. Miller & Co.	30	50,000 steam pumps
Canton Cutlery	35	35,000 table service
John Danner	20	30,000 bookcases
H. W. Werts & Co.	25	30,000 carriages
Canton Saw Works	15	30,000 saws
J. Dick & Bro.	7	10,000 hay cutters

/3/ Heald, E. T. The Stark County Story - Volume 1, 1949. Page 628.

/4/ Picture 1 shows, "The First Iron Bridge Erected in Stark Co. Built by C. M. Russell & Co. of Massillon, Ohio in 1859." The structure consisted of 2 inch timber planks on 8 inch timber stringers spanning approximately 10 feet with 14 inch metal I-floorbeams supported by two 15-inch metal trussed deck girders spanning about 28 feet. The members appear to be flimsy and the construction details crude. Estimated live load capacity is only 35 pounds per square foot.

It is interesting to note that the historic significance of this bridge was recognized by the Stark County Commissioners in 1899. The original structure was moved and is presently serving as a pedestrian bridge in Oak Knoll Park in Massillon, Ohio, the hometown of Russell & Co. The plaque on the bridge tells the story:

BUILT BY C. M. RUSSELL & CO. IN 1859
FOR

ELISHA TEETERS
ANDREW STAHL COUNTY COMMISSIONERS
L. ALEXANDER

IT WAS THE FIRST IRON BRIDGE BUILT IN
STARK CO. AND SAID TO BE THE FIRST IN THE
STATE OF OHIO. IT SPANNED A STREAM NEAR
ALLIANCE, OHIO, FOR FORTY YEARS.

PRESENTED TO RUSSELL & CO. IN 1899
BY

R. B. CRAWFORD
J. B. SUMMER COUNTY COMMISSIONERS
L. W. JOHNSON

ERECTED HERE FOR PRESERVATION AS A PIONEER
IN IRON BRIDGE BUILDING

- /5/ The Stark County Story. Page 628.
- /6/ The American Pictorial Monthly, Midsummer Edition, 1902. Page 25.
- /7/ (Stark County) Commissioners Journal, Volume 5, (1864-1874).
- /8/ The Stark County Story. Page 629
- /9/ The American Pictorial Monthly. Page 25.
- /10/ Ibid., Pages 24 and 25. (See Picture 4.)

- /11/ Figures 3 and 4 show details of the Navarre Road (Third Street S.E.) Bridge. Also Commissioners Journal, Volume 6, (1875-1884).
- /12/ "Designs of Wrought Iron Bridges built by the Wrought Iron Bridge Company," 1874. Pages 11-17.
- /13/ Picture 2 shows a rendering of the bridge at Navarre Road, taken from the "Illustrated Pamphlet of Wrought Iron Bridges," 1885, Page 11.
- /14/ The 1896 Stark County Atlas shows no street railway on Navarre Road. A 1905 City Plan and a 1908 City Survey shows one track on the bridge. A 1909 City Plan shows two tracks on the bridge.

- /15/ Commissioners Journal, Volume 13, (1911-1913) and Pictures 5 through 13.
- /16/ Edward J. Landor was chief engineer of the Wrought Iron Bridge Company at the time the bridge was built at Navarre Road. In 1913, he headed his own construction company. See Picture 3 and his biography on page 15 of this monograph.
- /17/ City inspection report, dated August 25, 1944.
- /18/ City plan, "Proposed 3rd Street S.E. Bridge Repair," dated March 1, 1950. (One sheet.)
- /19/ City plans, "Proposed 3rd Street S.E. Bridge Repair," dated March 8, 1977. (9 sheets.)
- /20/ Canton City Planning Department. "Environmental Assessment /Final Section 4(f) Evaluation. STA-60, 3rd Street S.E. Bridge." February 1982. Page 27.
- /21/ Ibid., pages 8, 14-17, 21 and 22.
- /22/ Ibid., page 12. Also City Bridge Inspection Reports.
- /23/ Ibid., pages 8 and 46. (See Picture 6.)
- /24/ "Designs of Wrought Iron Bridges," pages 12-14.
- /25/ Ibid., pages 15 and 16.
- /26/ Ketchum, M.S. The Design of Highway Bridges, 1920, Page 468.
- /27/ City report, "Third Street Bridge - Structural Analysis," dated February, 1982.
- /28/ "Designs of Wrought Iron Bridges," page 13.
- /29/ "Third Street Bridge - Structural Analysis."

BIOGRAPHIES GLEANED FROM INFORMATION SOURCES

Wrought Iron Bridge Company (1865-1899)

Year

- 1865 David Hammond formed Wrought Iron Bridge Co.
1871 Wrought Iron Bridge Co. incorporated. \$100,000 capitalization.
New plant located at East Ninth and Saxton Streets, Canton.
Sales - \$200,000
1872 Sales - \$400,000
1873 Sales - \$500,000
1880 Built a total of 3,300 bridges, to date, in 25 states and Canada.
1881 Plant employs 270 men.
1883 Built Navarre Road Bridge.
1892 Opened new plant at Dueber and Bridge Streets, Canton.
1899 Wrought Iron Bridge Company sold to American Bridge Company.
The Canton plant was one of 35 American Bridge plants.

1932 American Bridge Company closed the Canton plant.

Canton Bridge Company (1891-1925)

- 1891 Canton Bridge Company incorporated \$150,000 capitalization.
New plant located at Belden Avenue and Wheeler Street, Canton.
1901 Build 886 bridges this year, 6,000 to date.
1925 Canton Bridge Company sold to Massillon Steel Joist Co.
1927 Canton Bridge Company plant closed.

David Hammond (1830-1905)

- 1830 Born in Plain Township, Stark County on September 12.
1848 Carpenter apprentice to William Prince, in Canton.
1862 Secured patent, combination wood and iron bridges.
Obtained contract to build 60-foot metal bridge in Canton.
1864 Formed partnership with Washington Reeves.
Hammond and Reeves, bridge builders and contractors.
1865 Formed Wrought Iron Bridge Company.
1870 Withdrew from Hammond and Reeves.
1871 Incorporated Wrought Iron Bridge Company, served as president.
1881 Sales agent, Wrought Iron Bridge Company.
1890 Withdrew from Wrought Iron Bridge Company, sold his interest.
1891 Helped organize Canton Bridge Company, stockholder.
1892 Became President, Canton Bridge Company.
1897 Became Vice-President Canton Bridge Company, served until 1905.

Edward John Lander (1855-1946)

Year

1855 Born in Norwich, England, May 19.
1876 Graduated Rensselaer Polytechnic Institute, Troy N.Y.
1877 Assistant Engineer, Wrought Iron Bridge Co.
1882 Chief Engineer, Wrought Iron Bridge Co.
1888 Vice-President and General Manager, Wrought Iron Bridge Co.
1895 President, Wrought Iron Bridge Co.
1900 Assistant Engineer, American Bridge Co. Supervised construction of the Goats Island bridge, Niagara Falls.
1901 Designer and Resident Engineer, "Y" Bridge in Zanesville, Ohio.
1902 Purchasing Agent, Dominion Bridge Co., Montreal.
1904 Contractor, Built Factory Street concrete arch bridge over Tuscarawas River, Dover, Ohio.
1905 Constructed concrete bridges in South Bend and Mishawaka, Indiana.
1905 Designed the steelwork for the Courtland Hotel, Canton.
1906 Constructed the "Longwater Lagoon" at McKinley Monument, Canton.
1907 Constructed locks and dams on Muskingum River at Ellis, Ohio.
1913 Moved the Navarre Street Bridge to East Eighth Street (Third Street S. E.) Canton.
1914 Constructed Canton Sewage Treatment Plant and YMCA Building.
1916 Constructed Sunnyside Substation (Ohio Power Co.), Canton.
1923 Constructed filtration plant and sewage treatment plant, Sebring, Ohio.

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Vol. 6	1875-1884	Construction of Bridge at Navarre Road
--------	-----------	--

Vol. 13	1911-1913	Movement of Bridge to East Eighth Street (Third Street S.E.)
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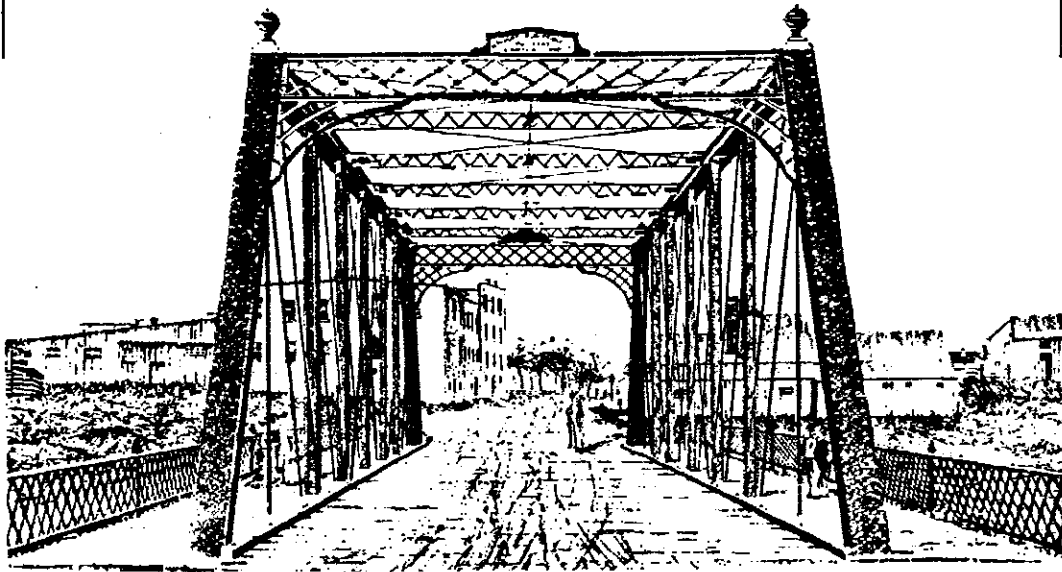
"Third Street S.E. Bridge File"

1868	Extension of Corporate Limits - City of Canton Tracing (poor Condition).
1870	Atlas of Stark County.
1875	Atlas of Stark County.
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1907	Navarre Street Plan.
1908	Situation Plan Navarre Street Bridge - Survey Book 59, Pg. 63.
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1970	Bridge Inspection Report, 1 page.
1972	Bridge Inspection Report, 1 page.
1976	Bridge Inspection Report, 1 page.
1977	3rd Street Bridge Improvement Plan Tracings, 10 sheets.
1981	3rd Street Bridge Replacement Plan, ODOT, 19 sheets.
1982	Existing 3rd Street Bridge - Structural Analysis.

1883

THIRD ST.S.E. BRIDGE

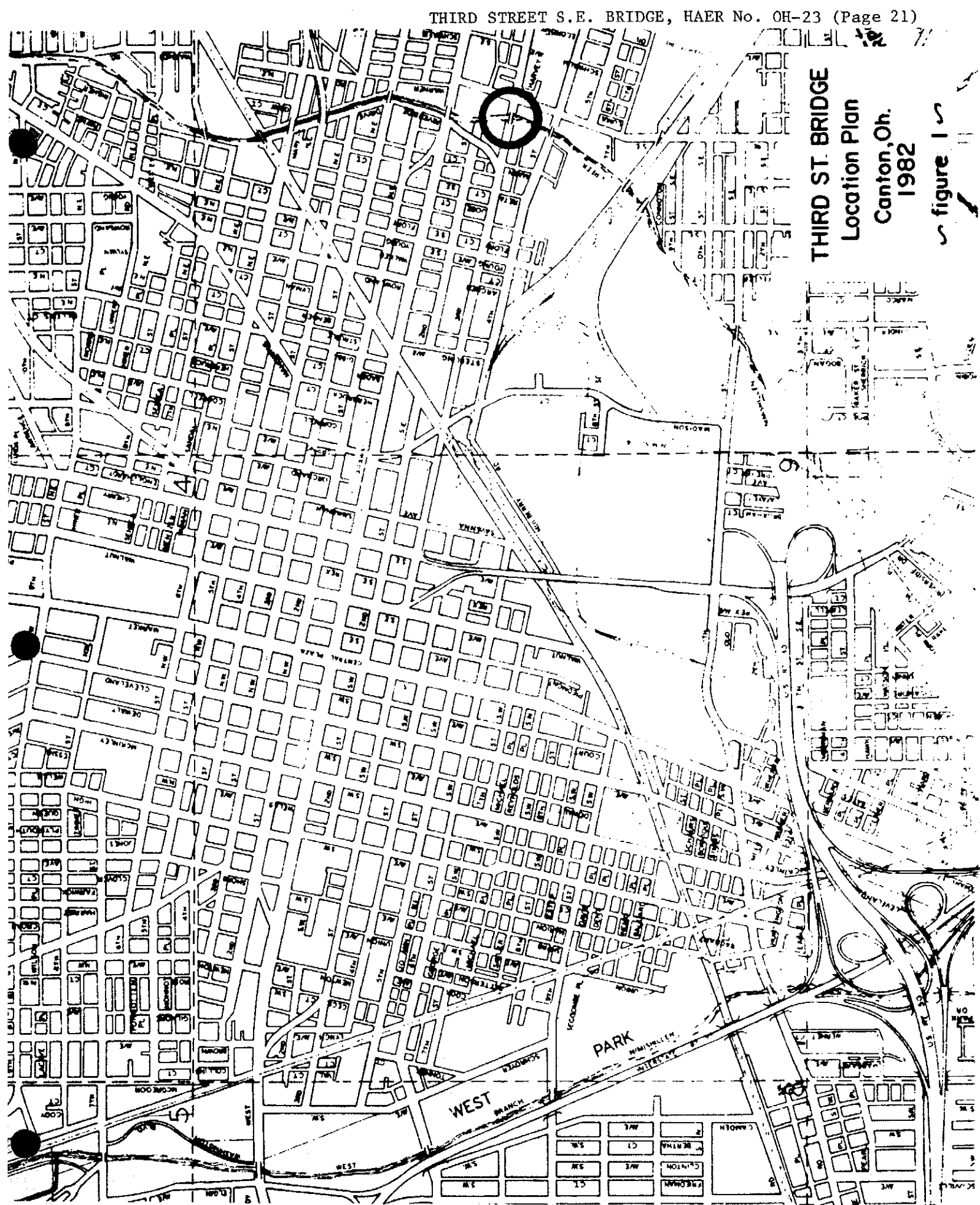
1982



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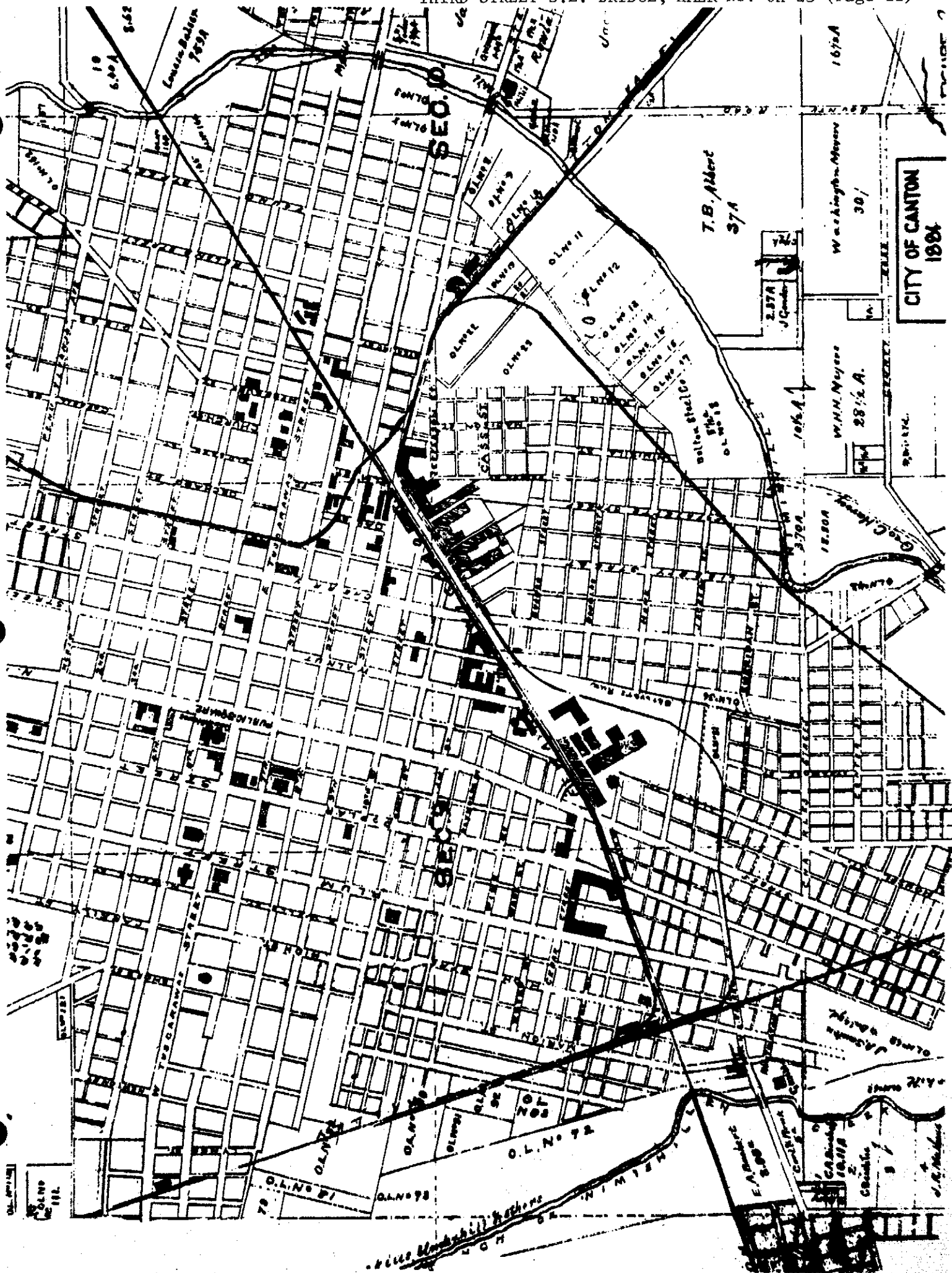
Wrought Iron Bridge Co.
CANTON, OHIO

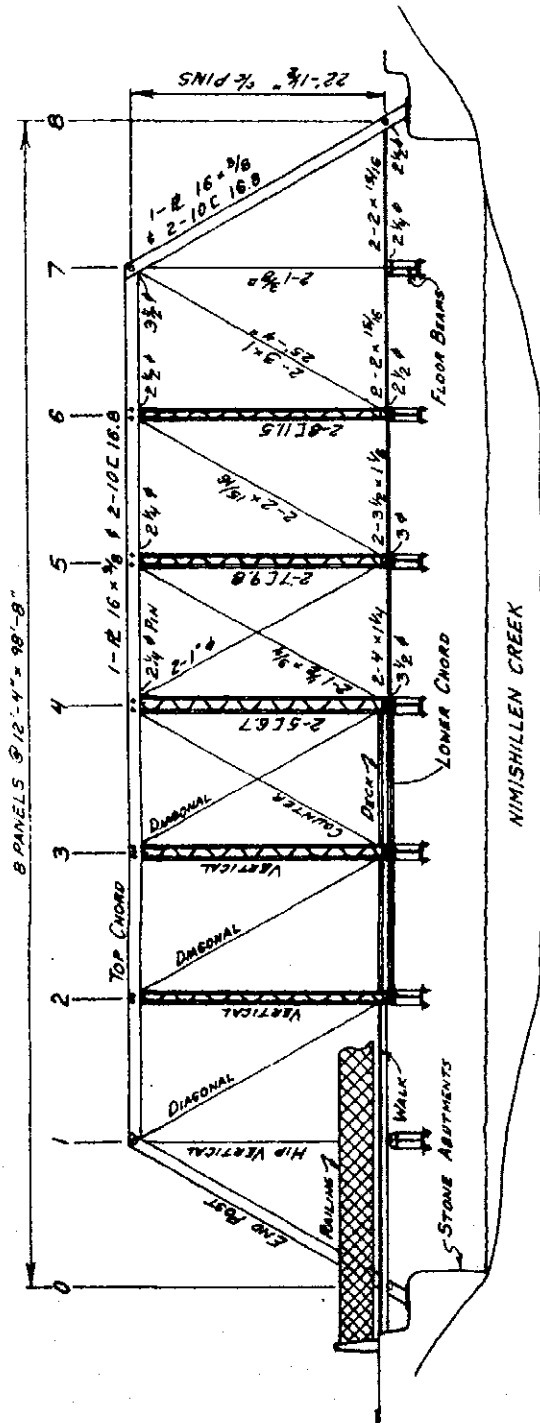
HISTORIC AMERICAN ENGINEERING RECORD
THIRD ST. S.E. BRIDGE 1883
CANTON, STARK COUNTY, OHIO
1982



THIRD ST. BRIDGE
Location Plan
Canton, Oh.
1982

figure 1



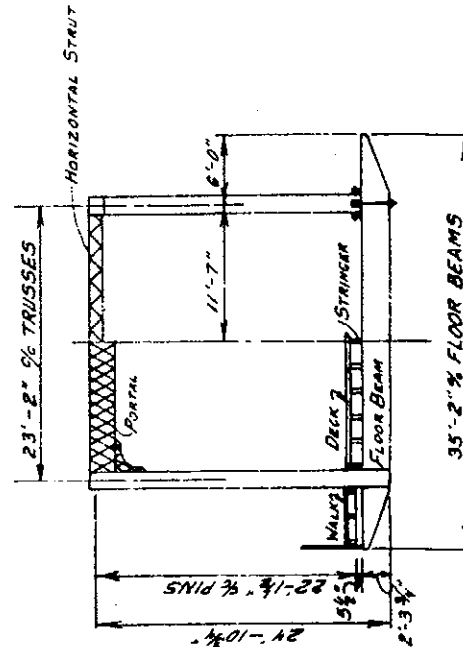


WROUGHT IRON BRIDGE CO.
CANTON, OHIO

1883 - ERECTED ON NAVARRE RD. S.W. OVER THE WEST
BRANCH OF THE NIMISHILLEN CREEK.

1913 - MOVED TO THIRD ST. S.E. OVER THE EAST
BRANCH OF THE NIMISHILLEN CREEK.

FIGURE 9



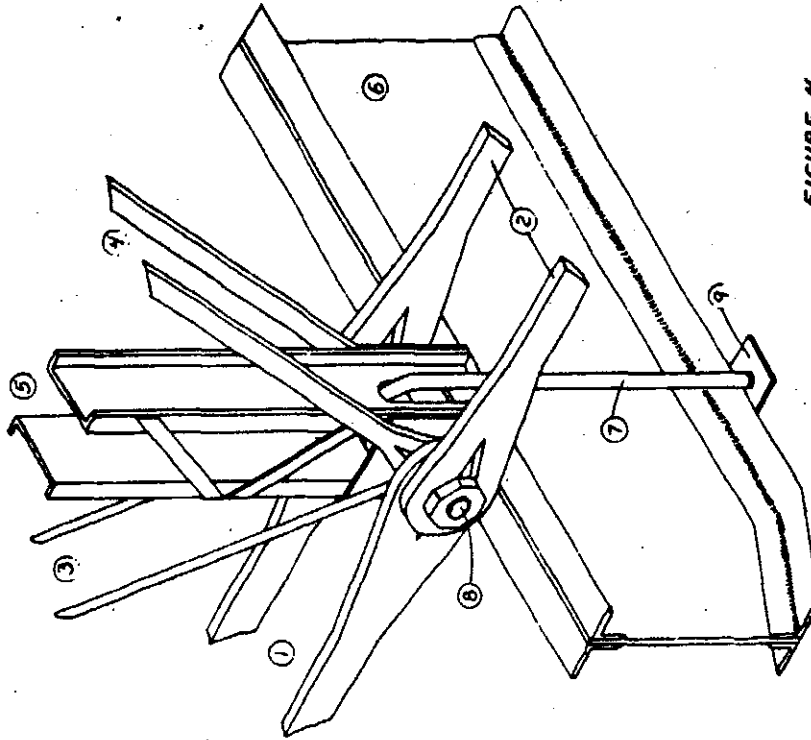
OFFICE OF THE CITY CIVIL ENGINEER
CANTON, OHIO

THIRD ST. S.E. BRIDGE
OVER THE EAST BRANCH OF
THE NIMISHILL CREEK

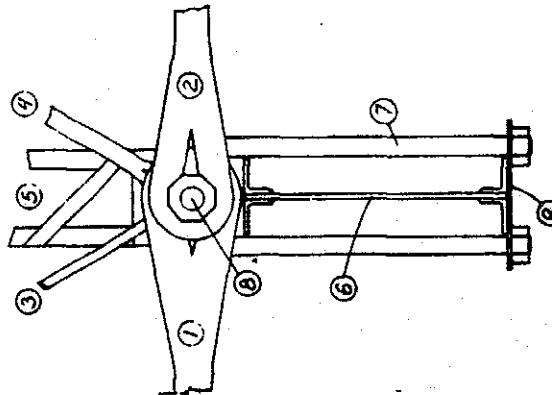
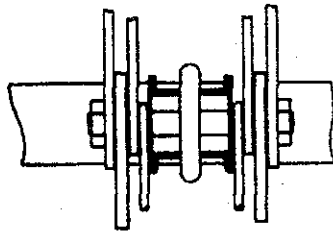
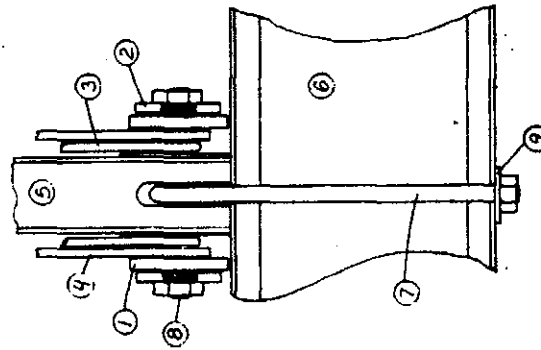
DRAWN
FEB. 1962
K.G. MLOSI

CITY CIVIL ENGINEER'S OFFICE
CANTON, OHIO
THIRD ST. S.E. BRIDGE
LOWER CHORD AND
BEAM CONNECTION DETAIL
Scale: 1/2" = 1'-0"
Date: 1-2-1967

FIGURE 4



MEMBER	
1	L4L5
2	LOWER CHORD
3	L5L6
4	LOWER CHORD
5	COUNTER
6	L5U6
7	DIAGONAL
8	VERTICAL
9	FLOOR BEAM
10	L5
11	U-BOLT
12	L5
13	PIN
14	L5
15	PLATE



L5